

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

- 1 1. (Original) A method of describing multiple packets to a
2 communication apparatus with a single descriptor, the method comprising:
3 receiving a header buffer comprising a header for each of N packets,
4 wherein $N > 1$;
5 receiving a data buffer comprising a payload for each of said N packets;
6 in a single descriptor configured to be read by the communication
7 apparatus, storing:
8 a base address of said header buffer;
9 a base address of said data buffer;
10 a checksum start offset indicating where to compute a checksum on
11 each of said N packets;
12 a checksum stuff offset indicating where to store the checksum in
13 each of said N packets; and
14 for each of said N packets:
15 a length of the payload for said packet;
16 a sample of the payload for said packet; and
17 a length of the header for said packet.
- 1 2. (Original) The method of claim 1, further comprising:
2 storing in said single descriptor:
3 a first indicator configured to indicate whether the headers for said

4 N packets are packed in said header buffer; and
5 a second indicator configured to indicate whether the
6 payloads for said N packets are packed in said data buffer.

1 3. (Original) The method of claim 1, further comprising:
2 storing in said single descriptor, for each of said N packets, an offset of the
3 packet's header within said header buffer.

1 4. (Original) The method of claim 1, further comprising:
2 storing in said single descriptor, for each of said N packets, an offset of the
3 packet's payload within said data buffer.

1 5. (Original) The method of claim 1, wherein the communication
2 apparatus is configured for InfiniBand, the method further comprising:
3 storing in said single descriptor:
4 an R_key for said header buffer; and
5 an R_key for said data buffer.

1 6. (Original) A computer readable medium storing instructions that,
2 when executed by a computer, cause the computer to perform a method of
3 describing multiple packets to a communication apparatus with a single
4 descriptor, the method comprising:
5 receiving a header buffer comprising a header for each of N packets,
6 wherein $N > 1$;
7 receiving a data buffer comprising a payload for each of said N packets;
8 in a single descriptor configured to be read by the communication
9 apparatus, storing:
10 a base address of said header buffer;

11 a base address of said data buffer;
12 a checksum start offset indicating where to compute a checksum on
13 each of said N packets;
14 a checksum stuff offset indicating where to store the checksum in
15 each of said N packets; and
16 for each of said N packets:
17 a length of the payload for said packet;
18 a sample of the payload for said packet; and
19 a length of the header for said packet.

1 7. (Currently amended) A processor-implementable method of using a
2 single descriptor to facilitate the passing of multiple packets to a communication
3 apparatus from a device driver, the method comprising:
4 storing multiple packets' headers contiguously within a header buffer;
5 storing payloads of the multiple packets contiguously within a data buffer;
6 providing said header buffer and said data buffer to ~~a~~the device driver for
7 ~~a~~the communication apparatus;
8 configuring ~~a~~the single descriptor to describe the multiple packets,
9 wherein configuring the single descriptor comprises including in the single
10 descriptor:
11 a base address of said header buffer;
12 a base address of said data buffer;
13 for each packet in the multiple packets:
14 a length of a header of the packet; and
15 a length of a payload of the packet;
16 a checksum start value configured to indicate where, in each of the
17 multiple packets, a checksum computation is to be initiated; and
18 a checksum stuff value configured to indicate where, in each of the

19 multiple packets, a checksum computation is to be stored;
20 configuring a second descriptor to reference said single descriptor, wherein
21 said second descriptor is a traditional descriptor configured to describe a single
22 packet;
23 passing said single descriptor and the second descriptor to the
24 communication apparatus; and
25 at the communication apparatus, reading the second descriptor to access
26 said single descriptor, and using said single descriptor to transmit the multiple
27 packets.

1 8-10. (Canceled).

1 11. (Currently amended) The method of ~~claim 9~~ claim 7, wherein
2 configuring ~~a~~ the single descriptor further comprises including in the single
3 descriptor:
4 a packed header indicator configured to indicate whether the multiple
5 packets' headers are packed in said header buffer; and
6 a packed data indicator configured to indicate whether the multiple
7 packets' payloads are packed in said data buffer.

1 12. (Currently amended) The method of ~~claim 9~~ claim 7, wherein
2 configuring ~~a~~ the single descriptor further comprises including in the single
3 descriptor:
4 for each packet in the multiple packets, a sample of the packet's payload.

1 13. (Currently amended) A computer readable medium storing
2 instructions that, when executed by a computer, cause the computer to perform a
3 method of using a single descriptor to facilitate the passing of multiple packets to

4 a communication apparatus from a device driver, the method comprising:
5 storing multiple packets' headers contiguously within a header buffer;
6 storing payloads of the multiple packets contiguously within a data buffer;
7 providing said header buffer and said data buffer to ~~a~~the device driver for
8 ~~a~~the communication apparatus;
9 configuring ~~a~~the single descriptor to describe the multiple packets,
10 wherein configuring the single descriptor comprises including in the single
11 descriptor:
12 a base address of said header buffer;
13 a base address of said data buffer;
14 for each packet in the multiple packets;
15 a length of a header of the packet; and
16 a length of a payload of the packet;
17 a checksum start value configured to indicate where, in each of the
18 multiple packets, a checksum computation is to be initiated; and
19 a checksum stuff value configured to indicate where, in each of the
20 multiple packets, a checksum computation is to be stored;
21 configuring a second descriptor to reference said single descriptor, wherein
22 said second descriptor is a traditional descriptor configured to describe a single
23 packet;
24 passing said single descriptor and the second descriptor to the
25 communication apparatus; and
26 at the communication apparatus, reading the second descriptor to access
27 said single descriptor, and using said single descriptor to transmit the multiple
28 packets.

1 14. (Currently Amended) A computer readable medium containing a
2 data structure configured to describe multiple packets to a communication

3 apparatus for transmitting the multiple packets, the data structure comprising:
4 a base address of a header buffer storing headers for the multiple packets;
5 a base address of a data buffer storing payloads for the multiple packets;
6 for each packet in the multiple packets:
7 a length of a header of the packet; and
8 a length of a payload of the packet;
9 a checksum start value configured to indicate where, in each of the
10 multiple packets, a checksum computation is to be initiated;
11 a checksum stuff value configured to indicate where, in each of the
12 multiple packets, a checksum computation is to be stored
13 a first indicator configured to indicate whether the headers are stored
14 contiguously in said header buffer; and
15 a second indicator configured to indicate whether the payloads are stored
16 contiguously in said data buffer.

1 15 (Canceled).

1 16. (Currently Amended) A computer readable medium containing a
2 data structure configured for describing multiple packets to a communication
3 apparatus for transmitting the multiple packets, the data structure comprising:
4 a base address of a buffer storing multiple packets;
5 for each packet in the multiple packets,
6 a length of the packet; and
7 when the packets are not stored contiguously in said buffer,
8 an offset of the packet in said buffer; and
9 a first indicator configured to indicate whether the packets are stored
10 contiguously in said buffer.

1 17 (Canceled).

1 18. (Currently amended) An apparatus for transmitting packets,

2 comprising:

3 a reader module configured to read a single descriptor configured to

4 describe multiple packets, wherein said single descriptor comprises:

5 a base address of a header buffer storing headers for the multiple
6 packets;

7 a base address of a data buffer storing payloads for the multiple
8 packets;

9 for each packet in the multiple packets;

10 a length of a header of the packet; and

11 a length of a payload of the packet;

12 a first indicator configured to indicate whether the headers are
13 stored contiguously in said header buffer; and

14 a second indicator configured to indicate whether the payloads are
15 stored contiguously in said data buffer;

16 a retrieval module configured to retrieve the multiple packets, wherein
17 said retrieval module comprises:

18 a header retriever configured to retrieve headers for the multiple
19 packets; and

20 a payload retriever configured to retrieve payloads for the multiple
21 packets; and

22 a transmitter module configured to transmit the multiple packets.

1 19-21 (Canceled).

1 22. (Currently amended) A method of describing multiple packets to a

2 communication apparatus, the method comprising:
3 for each packet, configuring a first data structure to identify:
4 a header length; and
5 a payload length;
6 a checksum start value configured to indicate where, in each of the
7 multiple packets, a checksum computation is to be initiated;
8 a checksum stuff value configured to indicate where, in each of the
9 multiple packets, a checksum computation is to be stored; and
10 a type of checksum;
11 storing in the first data structure headers for the packets and payloads for a
12 subset of the packets;
13 configuring a first descriptor to identify the first data structure;
14 configuring said first descriptor to identify a location of the headers and
15 a location of the payloads within the first data structure;
16 storing in a second data structure payloads for a subset of the packets;
17 configuring a second descriptor to identify a location of the payloads
18 within the second data structure; and
19 forwarding said first descriptor and said second descriptor to the
20 communication apparatus to facilitate transmission of the packets.

1 23-26 (Canceled).

1 27. (Currently amended) A computer readable medium containing data
2 structures for facilitating transmission of multiple packets from a communication
3 apparatus, the data structures comprising:
4 a first metadata structure configured to include:
5 a metadata section configured to identify, for each of the multiple
6 packets:

7 a header length; and
8 a payload length; and
9 a header section configured to store headers for the multiple
10 packets; ~~and~~
11 a first descriptor configured to identify:
12 a memory location of said first metadata structure; and
13 a location of said header section within said first metadata
14 structure; and
15 a checksum start value configured to indicate where, in each of the
16 multiple packets, a checksum computation is to be initiated; and
17 a checksum stuff value configured to indicate where, in each of the
18 multiple packets, a checksum computation is to be stored.

1 28. (Original) The computer readable medium of claim 27, further
2 comprising:
3 a second metadata structure configured to store payloads for the multiple
4 packets; and
5 a second descriptor configured to identify a memory location of said
6 second metadata structure.

1 29. (Original) The computer readable medium of claim 27, wherein:
2 said first metadata structure is further configured to include:
3 a payload section configured to store payloads for the multiple
4 packets; and
5 said first descriptor is further configured to identify:
6 a location of said payload section within said first metadata
7 structure.

1 30 (Canceled).

1 31. (Original) The computer readable medium of claim 27, wherein:
2 said first metadata structure is further configured to identify:
3 a type of checksum for checksumming the multiple packets.